

Abstract

The present invention provides a method for manufacturing high tensile strength steel plate having 570 MPa (N/mm²) or larger tensile strength and having also extremely superior balance of strength and toughness both before PWHT and after PWHT to that of the conventional steel plates, by specifically specifying the temperature-rising rate at the plate thickness center portion of a quenched and tempered material during tempering, and to be concrete, the method has the steps of: casting a steel consisting essentially of 0.02 to 0.18% C, 0.05 to 0.5% Si, 0.5 to 2.0% Mn, 0.005 to 0.1% Al, 0.0005 to 0.008% N, 0.03% or less P, 0.03% or less S, by mass, and balance of Fe and inevitable impurities; hot-rolling the cast steel without cooling the steel to the Ar₃ transformation point or lower temperature, or after reheating the steel to the Ac₃ transformation point or higher temperature, to a specified plate thickness; cooling the steel by direct quenching from the Ar₃ transformation point or higher temperature, or by accelerated cooling, to 400°C or lower temperature; and then tempering the steel, using a heating apparatus being installed directly connecting the manufacturing line containing a rolling mill and a direct-quenching apparatus or an accelerated cooling apparatus, to 520°C or above of the maximum ultimate temperature at the plate thickness center portion at an average temperature-rising rate of 1°C /s or larger at the plate thickness center portion up to a specified tempering temperature between 460°C and the Ac₁ transformation point.